



# UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE  
United States Patent and Trademark Office  
Address: COMMISSIONER FOR PATENTS  
P.O. Box 1450  
Alexandria, Virginia 22313-1450  
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/814,713	03/31/2004	Raymond Joe	TPS-012	8772
37694 7590 01/09/2009 WOOD, HERRON & EVANS, LLP (TOKYO ELECTRON) 2700 CAREW TOWER 441 VINE STREET CINCINNATI, OH 45202				
EXAMINER				
CHEN, BRET P				
ART UNIT		PAPER NUMBER		
1792				
NOTIFICATION DATE		DELIVERY MODE		
01/09/2009		ELECTRONIC		

**Please find below and/or attached an Office communication concerning this application or proceeding.**

The time period for reply, if any, is set in the attached communication.

Notice of the Office communication was sent electronically on above-indicated "Notification Date" to the following e-mail address(es):

dgoodman@whcpatent.com  
usptodock@whcpatent.com

# Office Action Summary

**Application No.**

10/814,713

**Applicant(s)**

JOE ET AL.

**Examiner**

Bret Chen

**Art Unit**

1792

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --  
**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☒ Responsive to communication(s) filed on 06 October 2008.  
2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.  
3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 1-19, 21, 22, 26-28, 32, 33 and 35-41 is/are pending in the application.  
4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.  
5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.  
6) ☒ Claim(s) 1-19, 21, 22, 26-28, 32, 33 and 35-41 is/are rejected.  
7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.  
8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☐ The specification is objected to by the Examiner.  
10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).  
11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).  
a) ☐ All b) ☐ Some \* c) ☐ None of:  
1. ☐ Certified copies of the priority documents have been received.  
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.  
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

- 1) ☒ Notice of References Cited (PTO-892)  
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)  
3) ☒ Information Disclosure Statement(s) (PTO/SB/08)  
Paper No(s)/Mail Date 12/16/08, 12/29/08.  
4) ☐ Interview Summary (PTO-413)  
Paper No(s)/Mail Date \_\_\_\_\_.  
5) ☐ Notice of Informal Patent Application  
6) ☐ Other: \_\_\_\_\_

### DETAILED ACTION

Claims 1-19, 21-22, 26-28, 32-33, 35-41 are pending in this application. Amended claims 1, 35 are noted.

The amendment dated 10/6/08 has been entered and carefully considered. The examiner appreciates the amendments to the claims. In view of said amendments, the 112 rejection and the previous art rejection has been withdrawn. In addition, in view of the arguments presented on p.10, the election of species has been withdrawn.

### *Claim Rejections - 35 USC § 103*

The text of those sections of Title 35, U.S. Code not included in this action can be found in a prior Office action.

**Claims 1-10, 13-15, 17-19, 21, 35-39, 41 are rejected under 35 U.S.C. 103(a) as being unpatentable over Xia et al. (6,426,015).**

Xia discloses a method of reducing elevated boron concentrations in an insulating layer containing silicon, boron and other elements where the layer interfaces with surfaces of a semiconductor device by seasoning a reaction chamber by flowing into it a mixture of gasses containing silicon, boron, ozone and other elements in predetermined proportions under set conditions of time, pressure, temperature and flow rates to deposit on inner walls and surfaces of the chamber a thin seasoning coating, and placing a semiconductor device in the chamber and covering it with an insulating layer having a composition similar to the seasoning coating (abstract). Specifically, a mixture of gases such as TEOS at 800 milligrams per minute (mgm), while keeping other gasses flowing at normal rates, e.g. TEB=120 mgm, TEPO=50 mgm, and

O.sub.3= 4000 sccm -12 wt. is flowed into the chamber at ambient temperature and a pressure of about 400 Torr and above for about 60 sec which results in passivation of the inner walls of the and leaves on the walls a thin oxide coating to a suitable thickness (col.2 lines 36-50).

Subsequently, a semiconductor wafer is inserted into the now "seasoned" chamber and insulation is applied to the devices on the wafer by a closely similar process using materials, times, and conditions such as utilized in the previous chamber "seasoning" treatment (col.2 lines 50-63). It is noted that this step can be performed after a previous processing step (col.2 lines 20-26). However, the reference fails to specifically teach a second manufacturing step.

As mentioned above, it is noted that the seasoning step can be performed after a previous processing step (col.2 lines 20-26). Given such a teaching, one skilled in the art would reasonably expect that the processing step can be repeated with the expectation of obtaining the same benefits. It would have been obvious to utilize a second manufacturing step as noted in Xia with the expectation of obtaining the same benefits.

Regarding claim 2, Xia teaches inner walls in col.2 lines 46-47.

Regarding claim 3, Xia teaches an oxide film in col.2 line 49.

Regarding claim 4, Xia teaches that the oxide film can be a doped silicon dioxide film in col.3 lines 4-5 and thus meets the claimed limitation.

Regarding claims 5-8, Xia teaches TEOS and ozone in col.4 lines 45-61.

Regarding claims 9, 13-15, the applicant requires elevating the temperature. This limitation appears to be taught in col.2 lines 36-63. Regardless, Xia teaches the conventionality of varying temperature and other parameters such as time, pressure, flow rates. It would have

been obvious to vary such parameters including temperature with the expectation of obtaining optimum deposition conditions. The same issue applies to claims 13-15.

Regarding claims 10, 17-18, the applicant requires a specific chamber pressure. Xia teaches a pressure chamber of 400 Torr or above (col.2 lines 39-40). Xia teaches the conventionality of varying pressure and other parameters such as temperature, time, flow rates. It would have been obvious to vary such parameters including temperature with the expectation of obtaining optimum deposition conditions. Furthermore, to lower pressure would have been obvious with the expectation of obtaining the known benefits such as reduced contamination at the expense of reduced throughput. The same issue applies to claims 17-18.

Regarding claims 19, 21, the applicant requires repeating the process. It is well settled that that repeating the process has no patentable significance unless a new and unexpected result is produced. The same issue applies to claim 21.

Regarding independent claim 35, the applicant requires a combination of the temperature, and the precursors. These issues have been addressed above.

The limitations of claims 36-39, 41 have been addressed above.

**Claims 11-12 are rejected under 35 U.S.C. 103(a) as being unpatentable over Xia et al. (6,426,015) in view of Law et al. (6,338,874).** Xia discloses a method of seasoning a reaction chamber by flowing into it a mixture of gasses containing silicon, boron, ozone and other elements to deposit a seasoning coating on inner walls and surfaces of the as noted above. However, Xia fails to teach purging.

Law teaches the conventionality of purging between deposition steps to minimize cross-contamination in a single chamber. It would have been obvious to utilize the purging step of Law in the process of Xia to reduce contamination.

**Claims 16, 22, 28, 40 are rejected under 35 U.S.C. 103(a) as being unpatentable over Xia et al. (6,426,015) in view of Discenzo (6,950,193).** Xia discloses a method of seasoning a reaction chamber by flowing into it a mixture of gasses containing silicon, boron, ozone and other elements to deposit a seasoning coating on inner walls and surfaces of the as noted above. However, Xia fails to teach SiN.

Discenzo teaches a system for monitoring substrate conditions (col.1 lines 26-30) in which a semiconductor device 300 is manufactured by depositing an insulating layer 306 on a substrate 304 (col.6 lines 54-55). The insulating layer 306 can be deposited by plasma CVD and can be silicon dioxide or other suitable materials such as silicon nitride and silicon oxynitride (col.6 lines 58-67). It would have been obvious to substitute silicon nitride for the silicon oxide in Xia's process with the expectation of obtaining similar results because Discenzo teaches that silicon nitride and silicon dioxide are suitable materials.

Regarding claims 22 and 28, Discenzo teaches forming a SiN as a second process as noted above. The same issue applies to claim 40.

**Claims 26-27, 32-33 are rejected under 35 U.S.C. 103(a) as being unpatentable over Xia et al. (6,426,015) in view of Discenzo (6,950,193) and further in view of Furuhashi et al. (2004/0132257).** Xia discloses a method of seasoning a reaction chamber by flowing into it a

mixture of gasses containing silicon, boron, ozone and other elements to deposit a seasoning coating on inner walls and surfaces of the as noted above while Discenzo teaches forming SiN. However, the prior art references fail to teach the appropriate precursors.

Furuhashi teaches the conventionality of forming silicon nitride films by reacting bis (tertiary-butylamino) silane and ammonia (claim 6). It would have been obvious to utilize the precursors in Furuhashi in the process of Xia and Discenzo with the expectation of obtaining similar results. The same issue applies to claims 32-33.

#### ***Response to Arguments***

Applicant's arguments with respect to claims above have been considered but are moot in view of the new ground(s) of rejection.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Bret Chen whose telephone number is (571)272-1417. The examiner can normally be reached on 7:30am - 4:00pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Timothy Meeks can be reached on (571) 272-1423. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/Bret Chen/  
Primary Examiner, Art Unit 1792  
1/5/09

Application/Control Number: 10/814,713  
Art Unit: 1792

Page 7